

# PATENT SPECIFICATION



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## PROVISIONAL SPECIFICATION

### Improvements relating to Containers such as Containers for Cooking Foodstuffs

We, AVELING-BARFORD, LIMITED, a company organised under the laws of Great Britain, of Grantham, Lincolnshire, and THOMAS HOWARD BOBBY WHITING, British subject, of Claremont House, Bottesford, Leicestershire, do hereby declare the nature of this invention to be as follows:—

This invention relates to a system for balancing a member, such as the cover of a container, which is mounted to swing about a fixed fulcrum and the weight of which as measured by its moment about its fulcrum varies in relation to its angular position and thus from a maximum when in the horizontal to a minimum when in the vertical position that is a plane passing through its fulcrum.

The system of this invention has been designed to counter-balance the weight of a cover for a container, such as those used for cooking foodstuffs, in order that it may be raised with ease and under the control of the operator throughout its angular movement of 90° to and from the opened position with the result that the cover will remain of its own accord in any one position between the horizontal and vertical.

In accordance with the invention the balancing system comprises a counterweight sufficient to balance the mass of the cover in a predetermined angular position and a load receiving device, such as a spring, adapted automatically to come into operation to support any unbalanced weight as relative between the cover and the counterweight when the cover has moved from a position where it is balanced solely by the counterweight.

The spring device may be arranged to enter into operation to maintain the balance as between the counterweight and the cover either during the latter part of the closing or opening movement of the cover or in the preferred arrangement separate spring devices are provided one of which is operative to maintain the balance when the lid is closing and the other of which maintains the balance when the cover is moving to its full open position.

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In one way of carrying out the invention a counterweight is suspended from a lever fast with the hinge pin (or the cover) and so arranged as to assist in the movement of raising the cover about its fulcrum, the weight however being insufficient to support the cover except at a point substantially midway between its open and closed positions.

Associated with the counterweight are two springs under the control of members themselves operatively controlled by a second lever, which is operatively connected to the cover so as to move in unison therewith, the control of each member being such as to effect a compression of its spring against a stop in order to maintain a balance when the cover is moving through that part of its movement just prior to its full open or closed positions.

A stop common to each spring may be provided and conveniently each spring is housed in a bore formed in the counterweight, the control members consisting of rods pivotally connected to a lever arm hinged on the bottom of the container and to which lever is pivotally connected a third rod supporting the counterweight. The latter rod is pivotally connected at its other end to the lever fast with the hinge pin and its point of connection with the lever arm or second lever is intermediate the pivotal connections of the control rods therewith.

The rod supporting the counterweight may be provided with a collar on which the weight is supported, the rod extending through a central bore in the latter.

In order to provide for the adjustment of the gear adjusting nuts are screwed on to the upper ends of the control rods and against which the springs abut their other ends being seated on a shoulder within the bores in the counterweight.

It will be understood that the cover may be provided with one or more hinges, and the weight may be in one unit or divided up into two or more units in varying shapes and sizes.

Similarly the levers and control rods may be duplicated according to convenience and requirements.

In operation, assuming that the cover is in a half open position where it is balanced by the counterweight alone and that it is now moved to the closed position, one of the springs will come into operation to take up the additional increasing load as the cover moves to close. It will be appreciated that as this movement takes place the distance between the pivotal connection of the corresponding control rod and the underside of the counterweight will lengthen with a result that the spring will be compressed by means of its adjusting nut against its supporting shoulder.

Likewise when the lid is opened the effect will be to release the compression of the spring and this will facilitate the raising of the cover or, in other words, compensate for the lack of weight in the counterweight during the first stage of opening.

As the cover is further opened the compressing on the spring will decrease until the latter is no longer operative and at a subsequent stage of opening the other

spring comes into operation since otherwise the counterweight would be too heavy resulting in this unbalanced weight tending to urge the cover to its full open position. The spring now operates in a similar manner to increase the resistance to the motion of the cover to open it.

A stop may be provided to limit the angle (open position) of opening and conveniently the second lever may be arranged to abut against the bottom of the container, or the lever fast on the hinge strike against a boss on the hinge plate.

It will be understood that in some cases e.g. with a very heavy cover plate or where the space to accommodate the counterweight is limited, the counterweight may not entirely but only partially balance the cover plate, the strength of the springs being arranged accordingly.

Dated this 29th day of January, 1936.

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#### COMPLETE SPECIFICATION

#### Improvements relating to Containers such as Containers for Cooking Foodstuffs

We, AVELING-BARFORD, LIMITED, a company organised under the laws of Great Britain, of Grantham, Lincolnshire, and THOMAS HOWARD BOBY WHITING, British subject, of Clarendon House, Bottesford, Leicestershire, do hereby declare the nature of this invention and in what manner the same is to be performed, to be particularly described and ascertained in and by the following statement:—

This invention relates to a system for balancing a member, such as the cover of a container, which is mounted to swing about a fixed fulcrum and the weight of which as measured by its moment about its fulcrum varies in relation to its angular position and thus from a maximum when in the horizontal to a minimum when in the vertical position that is a plane passing through its fulcrum.

The system of this invention has been designed to counter-balance the weight of a cover for a container such as those used for cooking foodstuffs, in order that it may be raised with ease and under the control of the operator throughout its angular movement of 90° to and from the opened position with the result that the cover will remain of its own accord in any one position between the horizontal and vertical.

In accordance with the invention the balancing system comprises a counterweight sufficient to balance the mass of the cover in a predetermined angular position and a load receiving device, such as a spring, adapted automatically to come into operation to support any unbalanced weight as relative between the cover and the counterweight when the cover has moved from a position where it is balanced solely by the counterweight.

The spring device may be arranged to enter into operation to maintain the balance as between the counterweight and the cover either during the latter part of the closing or opening movement of the cover or in the preferred arrangement separate spring devices are provided one of which is operative to maintain the balance when the lid is closing and the other of which maintains the balance when the cover is moving to its full open position.

The invention is illustrated in the accompanying drawings in which figures 1 and 2 are side elevations of a cooking vessel fitted with a balance gear in accordance with the invention and showing the lid respectively in the closed and open positions.

Referring to the drawings, A indicates generally the pan of the heating or cook-

ing vessel and B the lid thereof, the pan being mounted on a stand C. D is a counterweight for balancing the weight of the lid.

5 It will be obvious that the weight of the lid as measured about its fulcrum or hinge point indicated at 1 will vary from a maximum when in the horizontal position as shown in figure 1 to a minimum  
10 when in the fully open position of figure 2 where it lies in a vertical plane passing through the hinge axis 1.

Obviously therefore a counterweight which is capable of balancing the weight  
15 of the lid when fully closed would be too heavy for it when open and in the embodiment illustrated a balance is obtained in an intermediate position which for practical purposes may extend  
20 between the dotted line positions at X and Y (figure 2).

After the lid has passed the position Y the counterweight D becomes too heavy for the lid and it is desirable therefore to  
25 counteract the overbalancing effect of the weight.

The balancing system of this invention therefore comprises the use of means such as springs additional to the weight D, and  
30 two springs 2 and 3 are provided the spring 2 being effective between the position S and X and the spring 3 from Y to O.

In figure 1 it will be observed that the  
35 spring 2 is fully compressed and this is used to assist the opening movement of the lid by taking off the compression until it is fully extended as in the figure 2 position, which occurs at the point X. Similar  
40 remarks apply to the spring 3 which is fully compressed in the figure 2 position but as the lid closes from O to Y the compression is taken off when the spring is no longer effective to resist the closing  
45 movement of the lid.

For this purpose a lever arm 4 is provided, which is movable with the lid either by attaching it to a bracket 5 fast  
50 with the lid or it may be connected to the hinge pin 1 to which the lid is then fastened.

In the arrangement shown the bracket 5 pivots on the hinge pin 1, which is  
55 pivotally supported in lugs 7 integral with the rim of the pan A. Pivottally connected to the free end of the lever 4 is a link rod 8, which extends downwardly through a central opening 9 in the counterbalance weight D and is pivoted at  
60 its other end to a lever arm 10 fulcrumed at 11 in a stirrup piece 12 attached to the under side of the pan A.

A collar or shoulder 13 is provided on the rod 8 in order to support the counter-  
65 weight D, in which are two sockets 14 to

receive the springs 2 and 3.

Extending upwardly into the sockets through holes formed in the lower ends thereof are rods 15 and 16 pivotally  
70 attached at their lower ends to the lever arm 10 while their other ends are fitted with adjustable screwed collars 17. The springs 2 and 3 are passed over the ends of the rods within the sockets 14 and when  
75 in operation are in compression between the bottom of the sockets and the collars 17. Preferably as shown the bracket 5 will be provided with a boss into which  
80 lever arm 4 is screwed, the boss having a flat 20 engaging with the rim of the pan when the lid is fully opened as in figure 2. Alternatively the lever arm 10 is provided with an extension 18 adapted  
85 when the lid is fully opened as in figure 2 to abut against the stop plate 19 on the underside of the pan.

The spring 2 is placed in compression at the end of rod 15 by means of the  
90 adjusting nut 17 when the lid B is closed. As the lid B is raised the distance between the bottom of weight D and the pivotal connection of rod 15 and arm 10 shortens, and the rod therefore rises inside the weight. This has the effect of releasing  
95 the compression in the spring 2. In other words, the natural tendency of spring 2 when under compression is to release and this facilitates the raising of the lid V, or in other words, compensates  
100 for lack of weight in the weight D during the early stages of the passage of the lid. By the time lid B reaches the position X the effect of the spring 2 is negligible, and the weight of the counterweight is  
105 sufficient until point Y is reached.

When point Y is reached weight D has a tendency to be too heavy which results  
110 in bringing the lid B back. To counteract this another spring 3 is fitted on the rod 16 such that as lid B springs back from point Y it places spring 3 under  
115 compression, thereby increasing the resistance to the motion of the lid B between points Y and O. This will be evident from the fact that as lid B moves back, the distance between the underside of  
120 weight D and the connection of rod 16 and arm 10 increases.

The operation of the device will be obvious from the foregoing description,  
125 but stated briefly the counterbalancing operation is as follows:—

With the parts in the position shown in figure 1, that is, where the lid B is at  
130 its maximum weight, the lid B is balanced by the counterweight D plus the force of the fully compressed spring 2. As the lid B moves from position S to position X (see figure 2) the compression of spring 2 relaxes, and is fully relaxed when the  
135

lid B reaches position X, from here to position Y the lid B is balanced solely by the counterweight D. As the lid B moves from position Y, spring 3 begins to be compressed and to oppose the force of counterweight D and this continues until position O is reached when lid B is fully open and spring 3 is at maximum compression.

In other words, during the raising of the lid B from S to X spring 2 assists the counterweight D, from X to Y lid B and counterweight D are in equilibrium, with springs 2 and 3 inert, and from Y to O spring 3 opposes counterweight D.

By these means it is possible to counterbalance any lid B, throughout its full travel of 90° from closed to open, enabling it to be opened with ease, but at the same time maintaining such complete control that it will stop in any position between those limits as may be desired.

It is to be understood that for different size lids of different weights it may be possible to provide a weight D of suitable size to operate between points S and Y, whilst a compensating spring is required for the travel Y to O. Alternatively the weight may operate between points X to O, and the compensating spring between S and X.

The lid B may be provided with one or more hinges and the weight may be in one unit or divided up into two or more units in varying shapes and sizes, and having the various parts modified or altered to suit the multiple units.

Similarly lever 10 with its accessories may be in single or plural numbers according to convenience and requirements.

Having now particularly described and ascertained the nature of our said invention and in what manner the same is to be performed, we declare that what we claim is:—

1. In a closed cooking or other vessel provided with a hinged lid and having one or more counterweights for balancing the weight of the lid about its fulcrum, the employment of a load receiving means such as a spring and means actuated upon movement of the lid for varying the degree of compression of the spring or like member in order to compensate any unbalanced weight as relative between the lid and the counterweight when the former moves to or from the position where it is balanced solely by the counterweight.

2. A cooking or other closed vessel having a hinged lid adapted partly to be balanced by a counterweight in a position intermediate its open and closed positions, and spring means which is adapted respectively automatically to come into operation to balance in part or entirely the unbalanced weight of the lid in moving between the intermediate and open and closed positions.

3. An arrangement as claimed in claims 1 or 2 comprising one or more springs which are directly placed under compression by the movement of the counterweight in one or both directions.

4. An arrangement as claimed in claim 3 in which the counterweight is provided with one or more sockets to house the spring or like balancing members.

5. An arrangement as claimed in claim 4 in which the counterweight is supported by a link attached at one end to a lever movable with the lid and at its other end to a lever arm, and comprising rods anchored to the lever arm the springs being mounted on the rods for engagement with the counterweight and collars thereon.

6. Cooking and other vessels having a hinged lid provided with a balance system substantially as described with reference to the drawings.

Dated this 25th day of January, 1937.

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*Fig. 1.*

*[This Drawing is a reproduction of the Original on a reduced scale.]*



